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CNC CHARLESTON
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SAMPLING AND ANALYSIS PLAN FOR ZONE G BUILDING NS 3 FORMER UNDERGROUND STORAGE TANK NS 3-1 CNC CHARLESTON SC

9/1/2002

CH2M HILL

SAMPLING AND ANALYSIS PLAN
FOR
ZONE G; BUILDING NS 3
Former Underground Storage Tank NS 3-1
SCDHEC No: 00961

Charleston Naval Complex
North Charleston, South Carolina

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

Contract Number N62467-99-C-0960

September 2002

SAMPLING AND ANALYSIS PLAN
FOR
Zone G; Former UST NS 3-1

Charleston Naval Complex
North Charleston, South Carolina

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29406

Submitted by:
CH2M-JONES, LLC.
Charleston Naval Complex
1849 Avenue F
North Charleston, South Carolina 29405

J.A. JONES
ENVIRONMENTAL
SERVICES

CH2MHILL

Contract Number: N62467-99-C-0960

September 2002

ACRONYMS

bls	below land surface
BTEX	benzene, toluene, ethylbenzene and xylenes
BRAC	Defense Base Realignment and Closure Act
CAP	Corrective Action Plan
CNC	Charleston Naval Complex
COC	Chemical of Concern
DPT	Direct Push Technology
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
GEL	General Engineering Laboratories
µg/kg	microgram per kilogram
µg/L	microgram per liter
NAVFAC	Naval Facilities Engineering Command
OVA	Organic Vapor Analyzer
PAH	Polycyclic Aromatic Hydrocarbons
QA	Quality Assurance
QC	Quality Control
RA	Rapid Assessment
RAR	Rapid Assessment Report
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation Recovery Act
RFI	RCRA Facility Investigation
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SPORTENDETCHASN	Supervisor of Ship Building, Conversion and Repair, United States Navy, Portsmouth Virginia, Environmental Detachment Charleston
SSTL	Site-Specific Target Level
US EPA	United States Environmental Protection Agency
UST	Underground Storage Tank

TABLE OF CONTENTS

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by CH2M-JONES, LLC. The plan is designed for Underground Storage Tank (UST) NS3-1; located adjacent to Building NS3 at the Charleston Naval Complex (CNC), Charleston, South Carolina. This site contained a 280 gallon waste oil tank and an oil/water separator.

Originally this site was under the RCRA program as part of AOCs 675, 676, and 677, however a letter dated 5 February 2002, transferred the site to the UST program.

This SAP was developed using the information provided in the Zone I RCRA Facility Investigation Report (IR).

1.1 General Site Description

The CNC is in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina, as shown on **Figure 1**. This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River.

The site is located within the developed portion of the base. The area surrounding CNC is "mature urban," having long been developed with commercial, industrial, and residential land use. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek.

1.2 Site Background

The CNC began operations in 1901, when the Navy acquired the property. In 1993, the CNC was added to the list of bases schedule for closure under the Defense Base Realignment and Closure Act (BRAC). BRAC regulates the closure of the base and transition of the property back to the community. With the scheduled closure of the base, environmental cleanup has proceeded to make the property available for redevelopment after closure.

UST NS 3-1 is a former fuel pumping transfer station located just west of NS-4. The fuel transfer area was diked and sloped towards a storm drain in the east corner. The storm drain was connected to the storm sewer by two sets of valves and piping. The valve directed the storm water runoff directly to the storm sewer durning normal operations or through the oil/water separator to the storm sewer in the event of a spill in the fuel transfer area.

Building NS 3 is a former pump house. The site is located near Area of Concern (AOC) 675, Fuel Storage tank NS-4; and AOC 677.

2.0 PROPOSED SAMPLING PLAN

This SAP provides a method for evaluating the impact of groundwater in the vicinity of Building NS 3 and Former UST NS3-1. A total of three soil samples and one groundwater sample was collected during the removal of the UST at Building NS 3. Each sample (soils and groundwater) was sampled for BTEX, SVOCs, and metals (see Appendix I UST Assessment Report).

Based on the historical analytical results CH2M-Jones, LLC recommends that a sampling plan be implemented to confirm that groundwater and or soils in this area have not been impacted by the former operations. If analytical results indicate that levels are below the RBSLs, a No Further Action may be recommended for this site.

2.1 Sampling and Analysis Plan

Groundwater DPTs will be collected in the vicinity of the former UST. If Groundwater analytical from the DPTs indicate that there are COCs above the RBSLs, then a request for permanent monitoring wells will be submitted to SCDHEC.

DPTs will be analyzed for VOC, SVOC, and metals in accordance with the *South Carolina Risk-Based Corrective Action for Petroleum Releases.*

All sampling procedures will be conducted in accordance with EPA EISOPQAM and Ensafe/ Allen & Hoshall, Comprehensive Sampling and Analysis Plan, 1996.

2.2 DPT Collection

A total of four DPTs will be collected adjacent to former UST NS3-1 (see **Figure 2** for locations). Groundwater is typically located between 4-5 feet below land surface (bls) in this area so samples will be collected approximately 12 feet bls.

2.3 Surveying

All new sampling locations will be surveyed after collection.

2.4 Soil Boring Schedule

No other soils borings are scheduled for the SAP unless site conditions change and warrant otherwise.

2.5 Reporting

A Groundwater Monitoring Report will be submitted to SCDHEC following the sampling event. The report will summarize and include copies of field and laboratory analytical data and COC distribution.

2.6 Equipment Decontamination

If needed, all drilling equipment, augers, well casing and screens, and soil and groundwater sampling equipment involved in field sampling activities will be decontaminated according to the EPA EISOPQAM.

2.7 Sample Handling

Sample handling will be conducted in accordance to the following references: EPA EISOPQAM, Code of Federal Regulations 136, 1990, and EPA Users Guide to Contract Laboratory Program, 1988. The following forms will be completed for packing/shipping process: sample labels, chain-of-custody labels, appropriate labels applied to shipping coolers, and chain-of-custody forms.

2.8 Quality Control

In addition to periodic calibration of field equipment and the completions of the appropriate documentation, quality control (QC) samples will be collected during sampling events. QC samples may include field blanks, field duplicates, and trip blanks. Definitions of each can be found below as described by the EPA EISOPQAM:

- **Field Blank:** A sample collected using organic-free water, which has been run over/through sample collection equipment. These samples are used to determine if contaminants have been introduced by contact of the sample medium with sampling equipment. Equipment field blanks are often associated with collecting rinse blanks of equipment that has been field cleaned.

- **Field Duplicates:** Two or more samples collected from a common source. The purpose of a duplicate sample is to estimate the variability of a given characteristic or contamination associated with a population.

- **Trip Blank:** A sample, which is prepared prior to the sampling event in the actual container and is stored with the investigative samples throughout the sampling event. They are often packaged for shipment with the other samples and submitted for analysis. At no time after their preparation are trip blanks to be opened before they reach the laboratory. Trip blanks are used to determine if samples were contaminated during storage and/or transportation back to the laboratory (a measure of sample handling variability resulting in positive bias in contaminant concentration). If samples are to be shipped, trip blanks are to be provided with each shipment but not for each cooler.

2.9 Field Quality Assurance / Quality Control (QA/QC)

All sampling procedures will be conducted in accordance with EPA EISOPQAM.

QA/QC specifications for selected field measurements are summarized below.

Analysis	Control Parameter	Control Limit	Corrective Action
Air Monitoring	Check Calibration of OVA daily	Calibrate to manufactures specifications	Recalibrate. If unable to calibrate, replace.
pH of water	Continuing calibration check of pH 7.0 buffer	pH = 7.0	Recalibrate. If unable to calibrate, replace electrode.
Specific Conductance of water	Continuing calibration check of standard solution	> 1% of standard	Recalibrate.

2.10 Record Keeping

In addition to required sampling documentation, standardized forms, log sheets and logbooks will be completed during all field activities.

3.0 SITE MANAGEMENT AND BASE SUPPORT

Throughout the investigation activities, work on the CNC will be coordinated through SOUTHDIV and SCDHEC.

The primary contacts for each are as follows:

1. SOUTHDIV point of contact
   Gabe Magwood
   Southern Division Engineering Command
   2155 Eagle Drive
   North Charleston, SC 29406
   (843) 820-7307

2. SOUTHDIV point of contact
   Tony Hunt
   Southern Division Engineering Command
   2155 Eagle Drive
   North Charleston, SC 29406
   (843) 820-5525

3. SCDHEC point of contact
   Michael Bishop
   South Carolina Department of Health and Environmental Control
   2600 Bull Street
   Columbia, SC 29201
   (843) 898-4300

4.0 REFERENCES

South Carolina Department of Health and Environmental Control 2001. Risk-Based Corrective Action.

United States Environmental Protection Agency. 1996. EPA Environmental Investigations Standard Operating Procedures for Quality Assurance Manual.

SPORTENVDETCHASN. 1997. UST Assessment Report for NS3-1.

NOTE: Original figure created in color

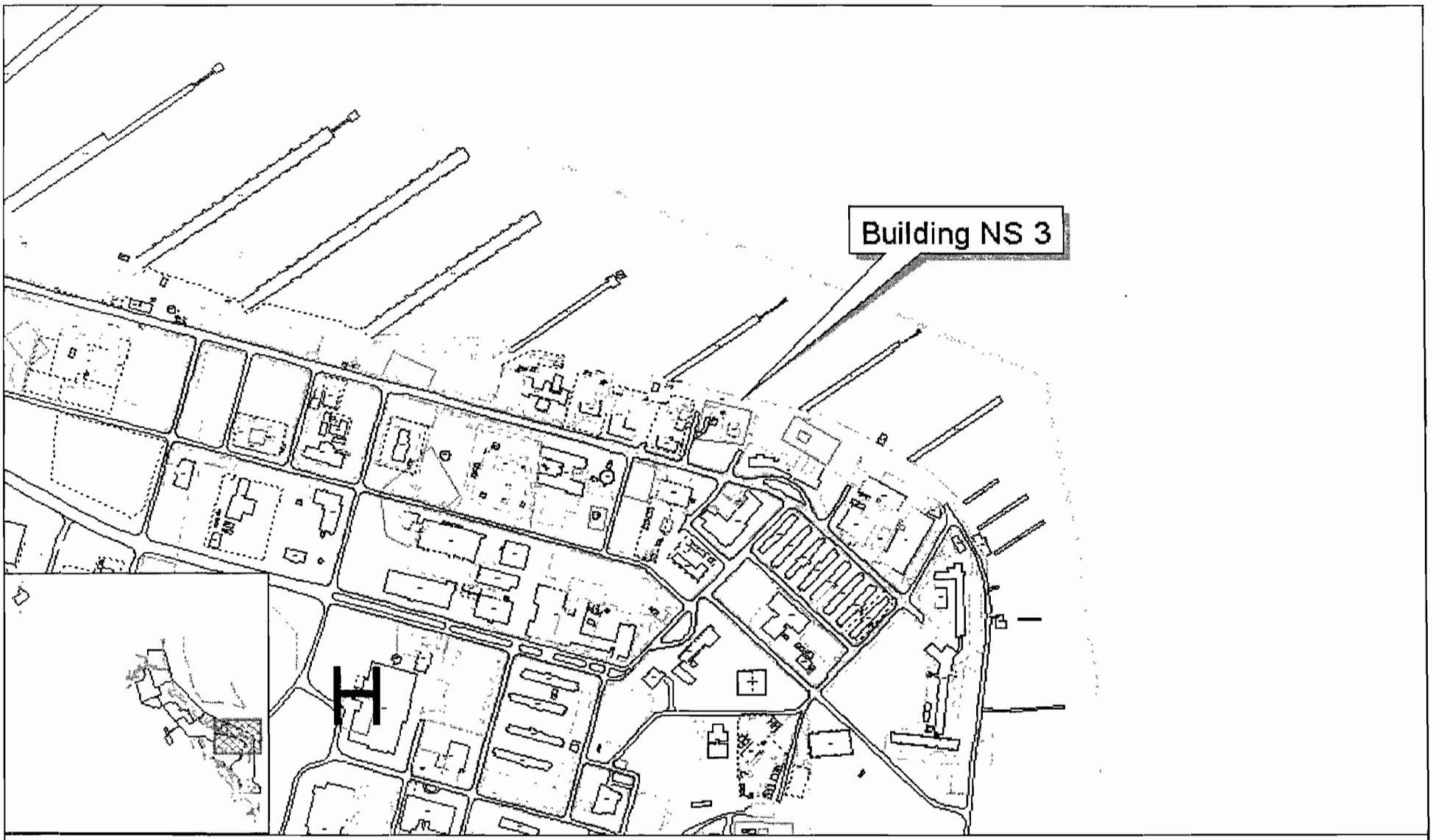


Figure 1
Site Location Map
NS 3
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\CHCIcnc-ogis.apr, Date: 26 Sep 2002 8:03, unknown user, EGIS: Charleston Naval Complex - Figure 1 Site Location Map

NOTE: Original figure created in color

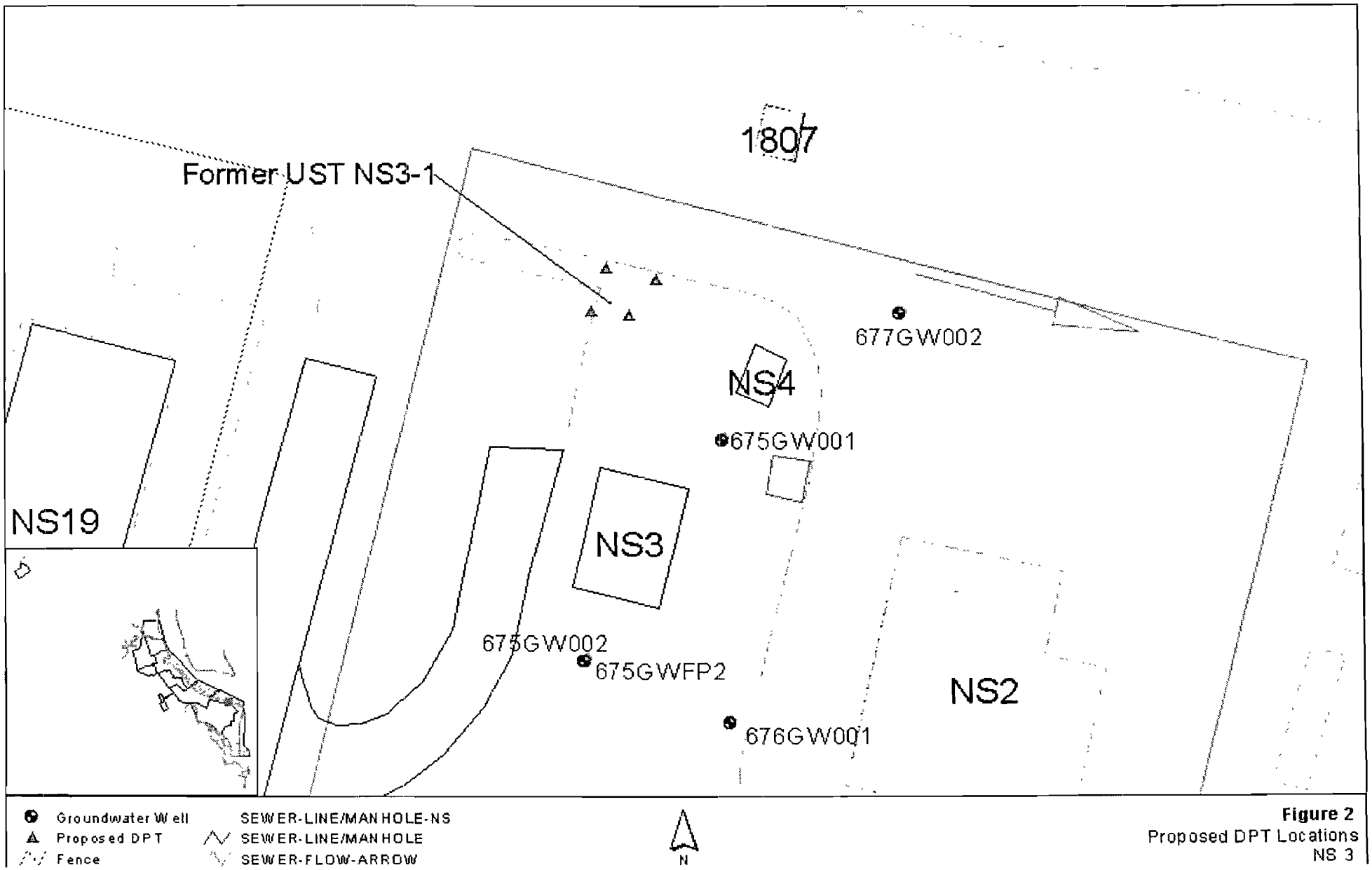
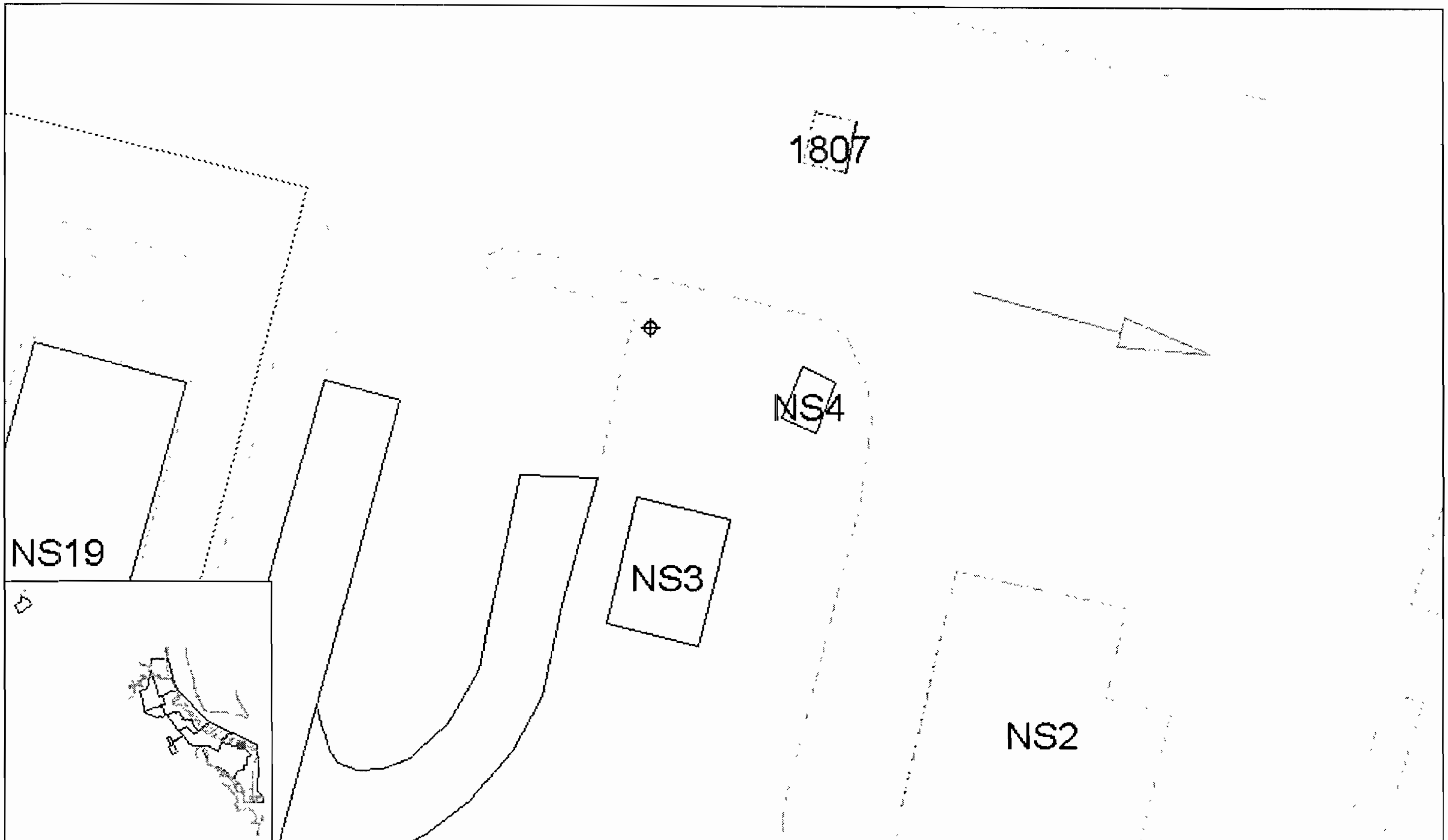


Figure 2
Proposed DPT Locations
NS 3

NOTE: Original figure created in color



UST
Fence
Railroads
Roads - Lines
Pavement
Sidewalk
SEWER-LINE/MANHOLE-NS
SEWER-LINE/MANHOLE
SEWER-FLOW-ARROW
Buildings

N

0 20 40 Feet

1 inch = 28.3382 feet

Figure 3
UST Location Map
NS 3
Charleston Naval Complex

CH2MHILL

File Path: C:\1\gis\CH\Ccnc-egis.apr, Date: 26 Sep 2002 8:29, unknown user, EGIS: Charleston Naval Complex - Figure 3 UST Location Map

APPENDIX I

South Carolina Department of Health and Environmental Control (S.C.D.H.E.C.)
Underground Storage Tank (UST) Assessment Report

Date Received State Use Only

Submit Completed Form to:
UST Regulatory Section
SCDHEC
2600 Bull Street
Columbia, South Carolina 29201
Telephone (803) 734-5331

I. OWNERSHIP OF UST(S)

Agency/Owner: Southern Division, Naval Facilities Engineering Command, Caretaker Site Office

Mailing Address: P.O. Box 190010

City: N Charleston State: SC Zip Code: 29419-9010

Area Code: 803 Telephone Number: 743-9985 Contact Person: LCDR Paul Rose

II. SITE IDENTIFICATION AND LOCATION

Site I.D. #: Unregulated

Facility Name: Charleston Naval Base Complex, NS 3

Street Address: Pirate Street

City: North Charleston, 29405-2413 County: Charleston

III. CLOSURE INFORMATION

Closure Started: 9 Jan 1997 Closure Completed: 3 Feb 1997

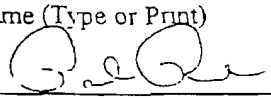
Number of USTs Closed: 1

N/A	SPORTENVDETCHASN
Consultant	UST Removal Contractor

IV. CERTIFICATION (Read and Sign after completing entire submittal)

I certify that I have personally examined and am familiar with the information submitted in this and all attached documents; and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate and complete

LCDR Paul Rose
Name (Type or Print)



Signature

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I certify that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate and complete

LCDR Paul Rose
Name (Type or Print)

Signature

V. UST INFORMATION

		Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A	Product	Waste oil					
B.	Capacity	280 gal					
C.	Age	Unk.					
D.	Construction Material	Steel					
E.	Month/Year of Last Use	Unk.					
F.	Depth (ft) To Base of Tank	7' 6"					
G.	Spill Prevention Equipment Y/N	N					
H.	Overfill Prevention Equipment Y/N	N					
I.	Method of Closure Removed/Filled	R					
J.	Visible Corrosion or Pitting Y/N	Y					
K.	Visible Holes Y/N	Y					

L. Method of disposal for any USTs removed from the ground (attach disposal manifests)

UST NS3-1 was removed, drained, cut open at both ends, and cleaned with a steam cleaner. It was then cut up for recycling as scrap metal. (See Attachment III.)

M. Method of disposal for any liquid petroleum, sludges, or waste waters removed from the USTs (attach disposal manifests)

UST NS3-1 had no sludge or residual waste oil. The waste water from the cleaning operation was recycled.

N. If any corrosion, pitting, or holes were observed, describe the location and extent for each UST

UST NS 3-1 was severely corroded and pitted. Holes were found throughout the tank ranging from 1/4" to 2" in diameter.

VI. PIPING INFORMATION

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6
A. Construction Material	Steel					
B. Distance from UST to Dispenser	6'					
C. Number of Dispensers	1 See note 1					
D. Type of System P/S	See note 1					
E. Was Piping Removed from the Ground? Y/N	Y					
F Visible Corrosion or Pitting Y/N	Y					
G. Visible Holes Y/N	N					
H Age	Unk.					

Note 1: UST NS3-1 was a gravity fed holding tank for an oil water separator.

I If any corrosion, pitting, or holes were observed, describe the location and extent for each line.

The piping had mild corrosion and pitting throughout its length, but no holes were found.

VII. BRIEF SITE DESCRIPTION AND HISTORY

UST NS 3-1 was a waste oil holding tank for an oil water separator on the grounds of Building NS3 on Naval Base Charleston. The building was a fuel pumping transfer station. The fuel transfer area was diked and sloped towards a storm drain in the east corner. The storm drain was connected to the storm sewer by two sets of valves and piping. The valves directed the storm water runoff either directly to the storm sewer during normal operations or through the oil water separator to the storm sewer in the case of a spill at the fuel transfer area.

Building NS 3 is a former pump house. The site is located near Area of Concern (AOC) 675, Fuel Storage tank NS-4; and AOC 677, the Grounds of Building NS-2. These sites are under investigation by the Navy and will be assessed as part of the Navy's Resource Conservation and Recovery Act (RCRA) Facility Investigation.

VIII. SITE CONDITIONS

		Yes	No	Unk
A	Were any petroleum-stained or contaminated soils found in the UST excavation, soil borings, trenches, or monitoring wells? If yes, indicate depth and location on the site map.		X	
B.	Were any petroleum odors detected in the excavation, soil borings, trenches, or monitoring wells? If yes, indicate location on site map and describe the odor (strong, mild, etc.)		X	
C.	Was water present in the UST excavation, soil borings, or trenches? If yes, how far below land surface (indicate location and depth)? UST excavation, 7' 6" below GSL, 10" deep	X		
D.	Did contaminated soils remain stockpiled on site after closure? If yes, indicate the stockpile location on the site map. Name of DHEC representative authorizing soil removal: _____		X*	
E.	Was a petroleum sheen or free product detected on any excavation or boring waters? If yes, indicate location and thickness on the site map.		X	

* Angular rock was used to fill the area covered by the groundwater. Geofabric was laid over the rock and then all soil from the excavation was returned to the tank pit.

IX. SAMPLE INFORMATION

S C.D.H E.C Lab Certification Number 10120

Sample #	Location	Sample Type (Soil/Water)	Depth*	Date/Time of Collection	Collected By	OVA#
SPORT 0291-1	North end of UST excavation	Soil	~7' 6"	10 Jan 97 1355	R. Jenkins	0 ppm
SPORT 0291-2	South end of UST excavation	Soil	~7' 6"	10 Jan 97 1405	R. Jenkins	0 ppm
SPORT 0291-3	Dirt pile	Soil	-	10 Jan 97 1415	R. Jenkins	0 ppm
SPORT 0291-4	Groundwater in UST excavation	Water	~7' 6"	10 Jan 97 1430	R. Jenkins	0 ppm

* = Depth Below the Surrounding Land Surface

X. SAMPLING METHODOLOGY

Provide a detailed description of the methods used to collect and store (preserve) the samples.

After the removal of UST NS3-1 soil and groundwater samples were taken. Sampling was performed in accordance with SC DHEC R.61-92 Part 280 and SC DHEC UST Assessment Guidelines.

Sample jars were prepared by the testing laboratory. The grab method was utilized to fill the sample containers leaving as little head space as possible and immediately capped. Soil samples were extracted at the tank ends just above the groundwater level. The groundwater sample were taken from the bottom center of the excavation. A biased composite sample was taken from the excavation dirt pile to characterize the soil for reuse or remediation.

The samples were marked, logged, and immediately placed in sample coolers packed with ice to maintain an approximate temperature of 4° C. Tools were thoroughly cleaned and decontaminated with organic-free soap and water after each sample.

The samples remained in the custody of SPORTENVDETCHASN until they were transferred to General Engineering Laboratories for analysis as documented in the attached Chain-of-Custody Record.

XI. RECEPTORS

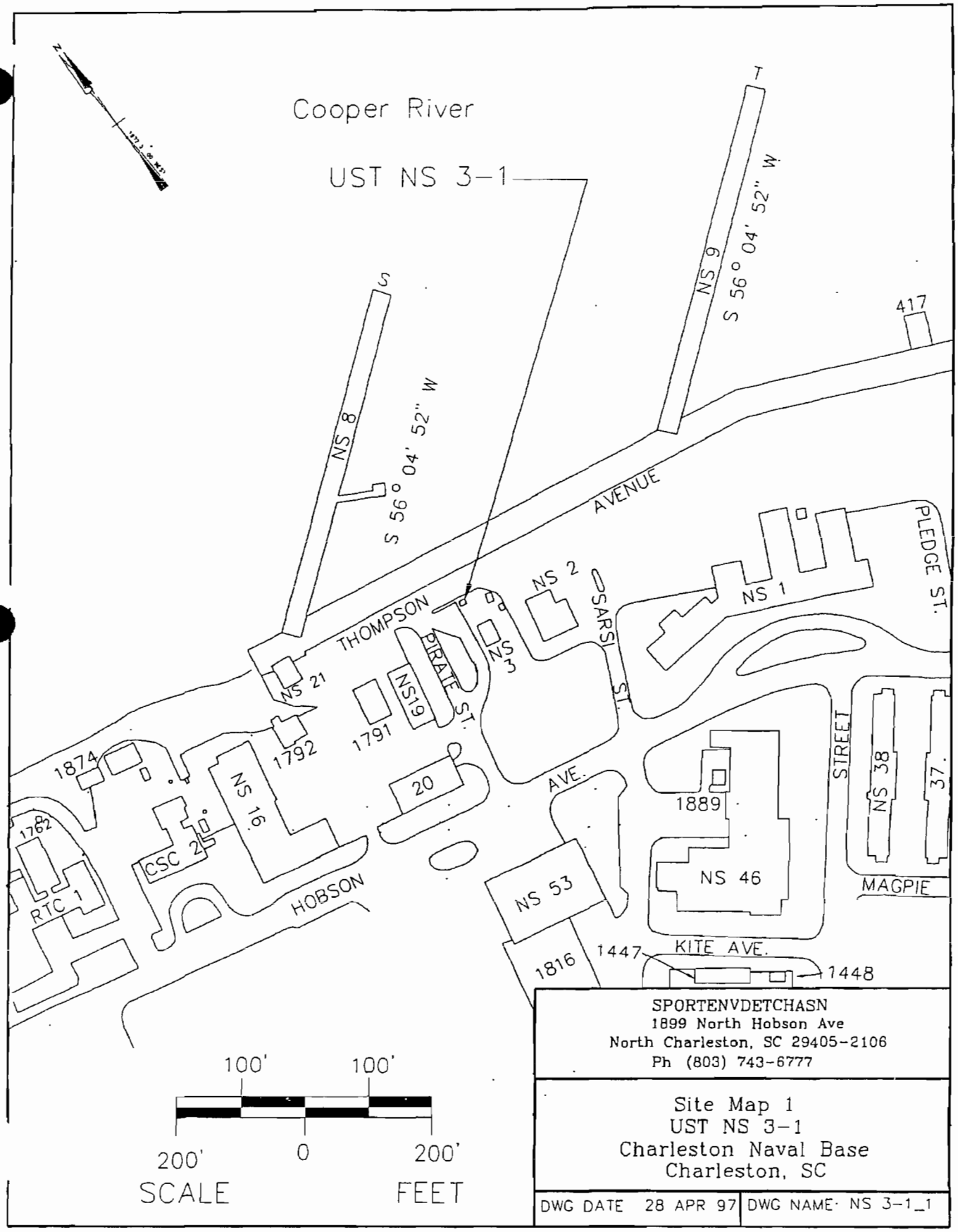
		Yes	No
A.	Are there any lakes, ponds, streams, or wetlands located within 1000 feet of the UST system? **[Cooper R. ~112']** If yes, indicate type of receptor, distance, and direction on site map.	X	
B	Are there any public, private, or irrigation water supply wells within 1000 feet of the UST system? If yes, indicate type of well, distance, and direction on site map.		X
C.	Are there any underground structures (e.g., basements) located within 100 feet of the UST system? If yes, indicate the type of structure, distance, and direction on site map.		X
D.	Are there any underground utilities (e.g., telephone, electricity, gas, water, sewer, storm drain) located within 100 feet of the UST system that could potentially come in contact with the contamination? **[storm drain, steam line]** If yes, indicate the type of utility, distance, and direction on the site map.	X	
E.	Has contaminated soil been identified at a depth of less than 3 feet below land surface in an area that is not capped by asphalt or concrete? If yes, indicate the area of contaminated soil on the site map.		X

Attachment I

SITE MAP

You must supply a scaled site map. It should include all buildings, road names, utilities, tank and pump island locations, sample locations, extent of excavation, and any other pertinent information

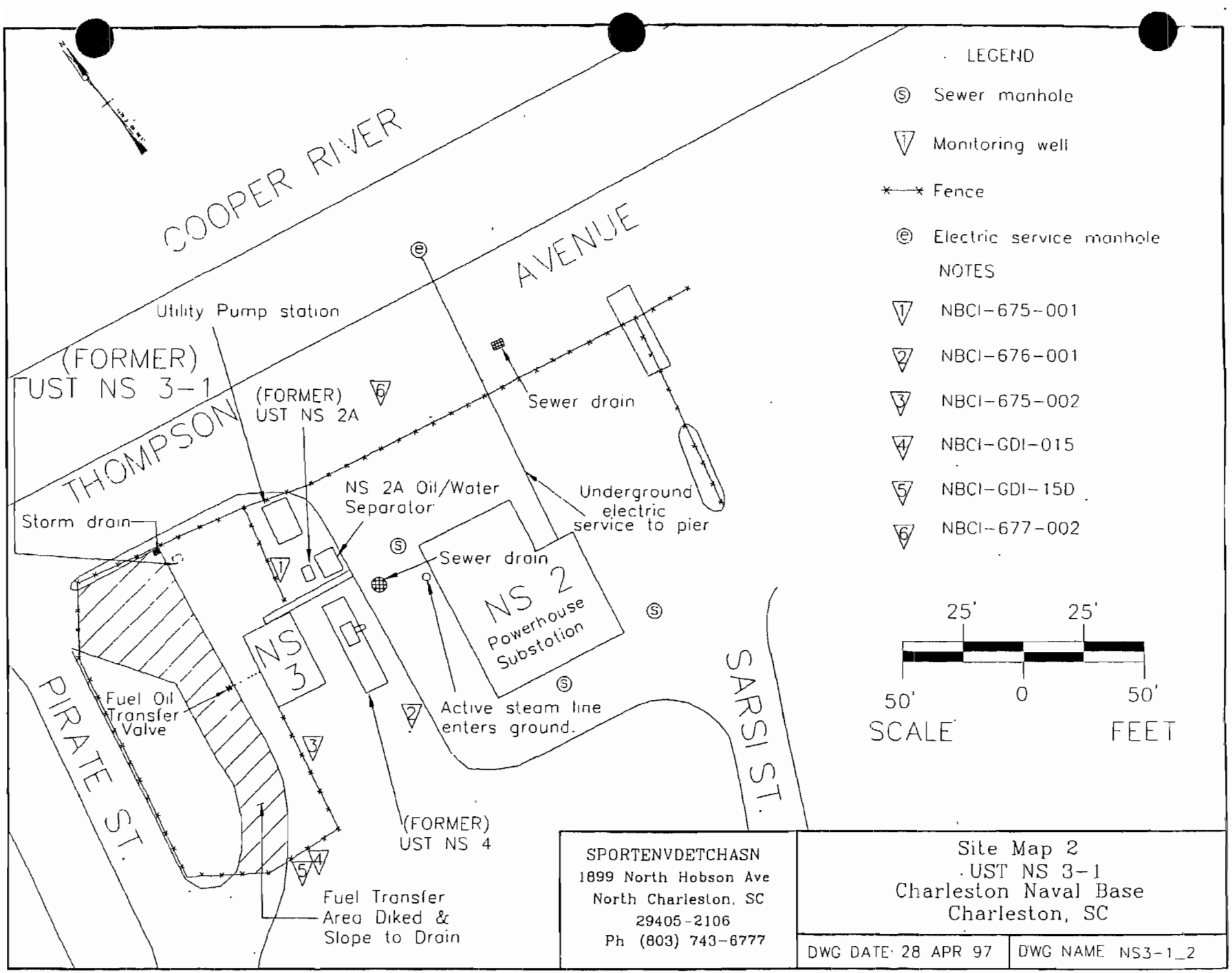
Site Maps 1, 2, 3, and 4
Photographs 1 and 2



SPORTENVDETCHASN
1899 North Hobson Ave
North Charleston, SC 29405-2106
Ph (803) 743-6777

Site Map 1
UST NS 3-1
Charleston Naval Base
Charleston, SC

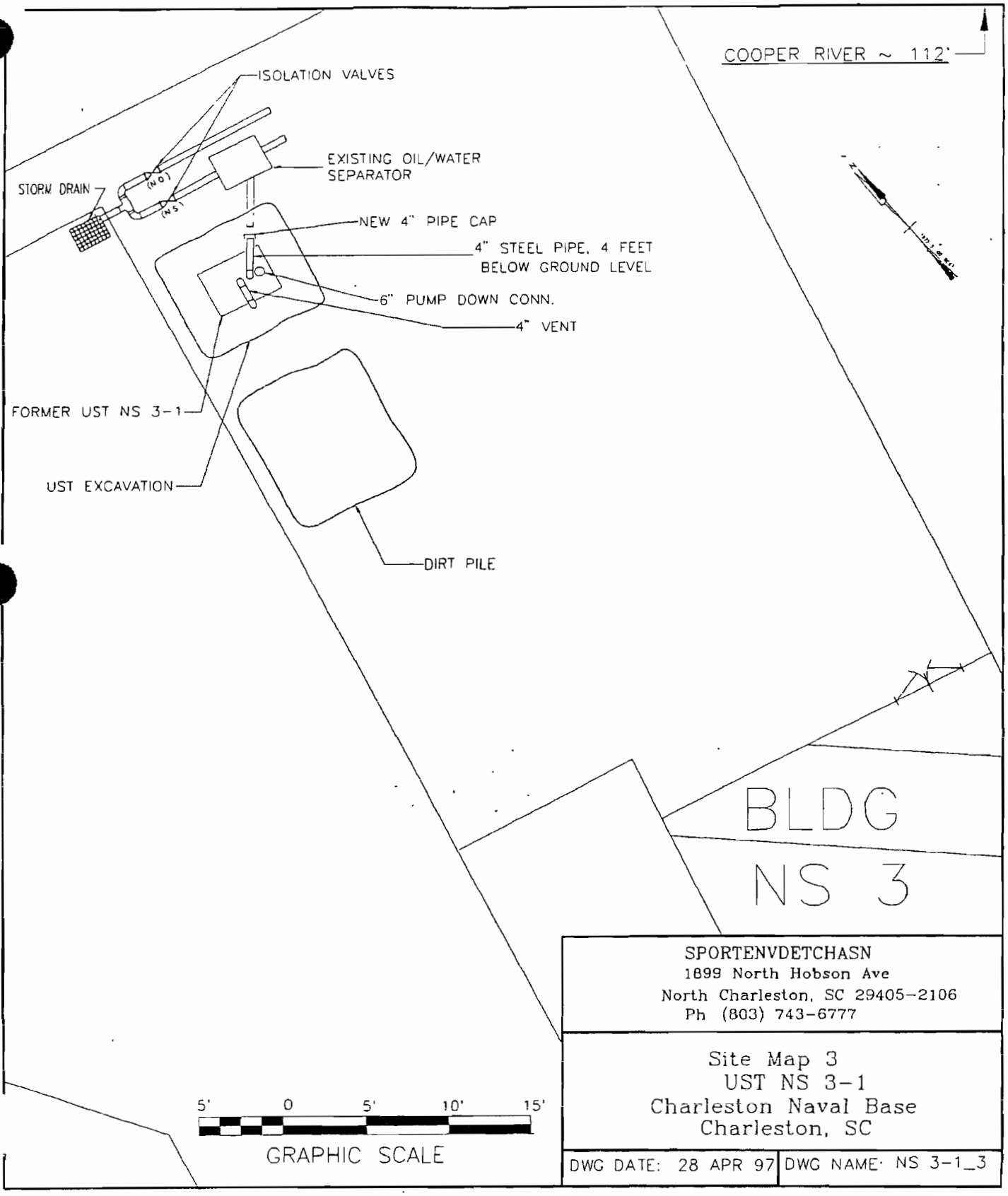
DWG DATE 28 APR 97 | DWG NAME: NS 3-1_1



SPORTENVDETCHASN
1899 North Hobson Ave
North Charleston, SC
29405-2106
Ph (803) 743-6777

Site Map 2
UST NS 3-1
Charleston Naval Base
Charleston, SC

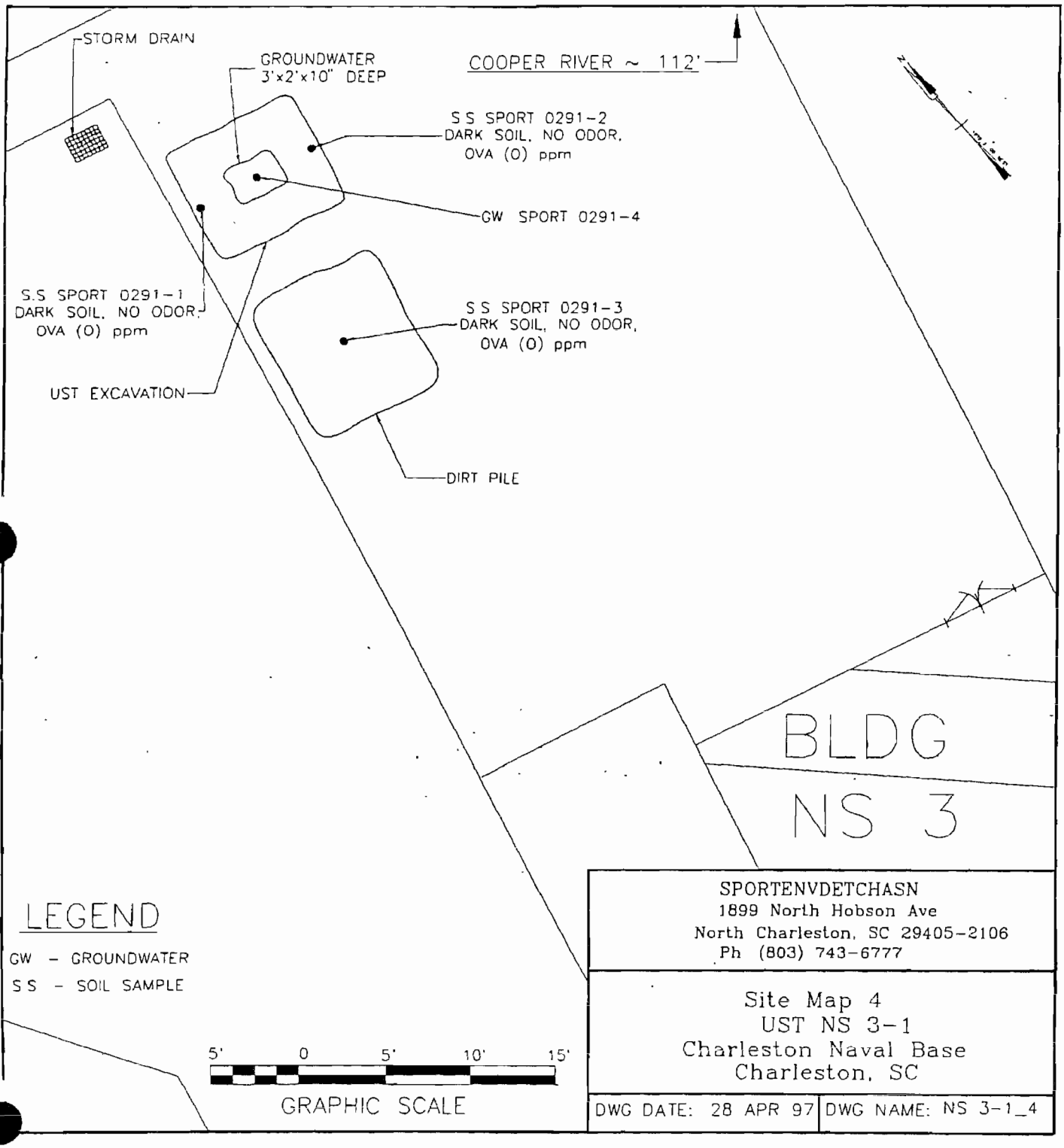
DWG DATE 28 APR 97 | DWG NAME NS3-1_2



SPORTENVDETCHASN
1899 North Hobson Ave
North Charleston, SC 29405-2106
Ph (803) 743-6777

Site Map 3
UST NS 3-1
Charleston Naval Base
Charleston, SC

DWG DATE: 28 APR 97 | DWG NAME: NS 3-1_3



SPORTENVDETCHASN
1899 North Hobson Ave
North Charleston, SC 29405-2106
Ph (803) 743-6777

Site Map 4
UST NS 3-1
Charleston Naval Base
Charleston, SC

DWG DATE: 28 APR 97 | DWG NAME: NS 3-1_4

UST NS 3-1

Photo 1: UST NS3-1 being hoisted from the excavation. The crimp on the end was accidentally created during the excavation process, and is indicative of how thin the sheetmetal was.

Photo 2: Close up of one end of UST NS3-1. The arrows point to holes created by corrosion.